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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/061,494	01/31/2002	G. William Walster	SUN-P6431-SPL	2067

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EXAMINER

DO, CHAT C

ART UNIT PAPER NUMBER

2124

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/061,494

Applicant(s)

WALSTER ET AL.

Examiner

Chat C. Do

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 1/31/02; 5/27/04; 6/7/04; 10/12/04.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/7/04; 10/12/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claims 1, 4, 6, 9, 11, 14, and 16 are objected to because of the following informalities:

Re claim 1, the applicant is advised to amend the phrase " $Ax = b$  by multiplying through by a matrix B" in lines 4-5 as " $Ax = b$  by multiplying both sides of the linear equations by a matrix B" for clearly defining that a matrix B is multiplying to both sides of equations as  $BAx = Bb$ . Re claims 6, 11, and 16, they have same objection.

Re claim 4, the applicant is advised to remove the parentheses in line 4 because the limitation inside the parentheses is not a reference. Re claims 9 and 14, they have same objection.

Re claim 16, the applicant is advised to either amend or cancel this claim because it has same limitations cited in claim 3 regardless slightly wording and placement.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the limitations “the midpoints of the elements of  $M$ ” in lines 7-8 and “the hull  $h$ ” in line 9 lack antecedence basis and are unclear. The midpoints of the element of  $M$  is unclear whether it means the middle portion of matrix  $M$  form or become an identity matrix or it means the matrix  $M_{n/2}$  form or become an identity matrix. The applicant does not define clearly what’s the hull of the system and how it relates to the set of linear equations. For examination purposes, the examiner disregards these limitations. Claims 6, 11, and 16 have same rejection.

Re claim 2, the limitation “computing an approximate center  $A_c$  of the matrix  $A$ ” is unclear. Since the claim does not define how to compute the approximate center  $A_c$  of the matrix  $A$ , it is unclear whether or not the center  $A_c$  of the matrix  $A$  is a mid portion of matrix  $A$ . For examination purposes, the examiner disregards these limitations. Claims 7, 12, and 18 have same rejection.

Re claim 3, the limitation “ $r_1$ ” lacks an antecedence basis. For examination purposes, the examiner considers this limitation as any and all elements of matrix  $r$ . Claims 4, 8-9, 13-14, and 16 have same rejection.

Thus, claim 5, 10, 15, and 17 have same rejection for being dependent on the rejected base claims 1, 6, 11, and 16 respectively.

#### ***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

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5. Claims 1-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-5 and 16-18 clearly recite a method for calculating bounding solution set of a system of linear system according to a mathematic algorithm. Claims 6-10 and 11-15 recite a storage medium for storing instruction and an apparatus, respectively, for implementing the above process but fail to limit the apparatus to any particular structure other than a general computer with input, memory, and processing devices. Indeed, any apparatus used to implementing the underlined process would result in an apparatus as claimed. In order for such a claimed method, computer-related process, or a claimed non-specified apparatus implementing the underlined process to be statutory, the claims must include either a step or means that results in a physical transformation outside the computer or a limitation to a practical application. However, it is clear from the claims that the claims merely recite step or non-specific means for data computation and manipulation in performing a mathematical function. The input is a set of number and output is also a set of number. The claims fail to recite any step or means that results in a physical transformation outside the computer, that includes a limitation to a practical application, or that requires a specific computer to implement the claimed process. Therefore, claims 1-5, 16-18, 6-10, and 11-15 are clearly directed to a non-statutory subject matter.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 4-7, 9-12, and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Eldon Hansen (“Global Optimization using Interval Analysis”).

Re claim 1, Eldon Hansen discloses in pages 23-33 under Interval Linear Equation section a method for bounding the solution set of a system of linear equations  $Ax = b$ , wherein  $A$  is an interval matrix and  $b$  is an interval vector (page 30 lines 1-5), the method comprising: preconditioning the set of linear equations  $Ax = b$  by multiplying through by a matrix  $B$  to produce a preconditioned set of linear equations  $Mox = r$ , wherein  $Mo = BA$  and  $r = Bb$  (page 30 lines 6-12); widening the matrix  $Mo$  to produce a widened matrix  $M$ , wherein the midpoints of the elements of  $M$  form the identity matrix (page 30 lines 15-25); and using  $M$  and  $r$  to compute the hull  $h$  of the system  $Mx = r$ , which bounds the solution set of the system  $Mox = r$  (page 30 lines 30-45).

Re claim 2, Eldon Hansen further discloses in pages 23-33 under Interval Linear Equation section the matrix  $B$  by: computing an approximate center  $Ac$  of the matrix  $A$ ; and forming  $B$  by computing an approximate inverse of  $Ac$ ,  $B = (Ac)^{-1}$  (page 30 lines 5-9).

Re claim 4, Eldon Hansen further discloses in pages 23-33 under Interval Linear Equation section assuring that  $\sup(r_i) \geq 0$  by changing the sign of  $r_i$  and  $x_i$  if necessary (page 32 last paragraph).

Re claim 5, Eldon Hansen further discloses in pages 23-33 under Interval Linear Equation section a determining if M is regular (page 33 under section 4.8); and using the Gauss-seidel process for computing the hull h if M is not regular (pages 31-32).

Re claim 6, it is a computer-readable storage medium for storing instructions claim of claim 1. Thus, claim 6 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 7, it is a computer-readable storage medium for storing instructions claim of claim 2. Thus, claim 7 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 9, it is a computer-readable storage medium for storing instructions claim of claim 4. Thus, claim 9 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 10, it is a computer-readable storage medium for storing instructions claim of claim 5. Thus, claim 10 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 11, it is an apparatus claim of claim 1. Thus, claim 11 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 12, it is an apparatus claim of claim 2. Thus, claim 12 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

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Re claim 14, it is an apparatus claim of claim 4. Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 15, it is an apparatus claim of claim 5. Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do  
Examiner  
Art Unit 2124

November 29, 2004

*Kakali Chaki*

**KAKALI CHAKI  
SUPERVISORY PATENT EXAMINER  
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